



US006613856B1

(12) **United States Patent**
Drummond et al.

(10) **Patent No.:** **US 6,613,856 B1**
(45) **Date of Patent:** **Sep. 2, 2003**

(54) **BIFUNCTIONAL POLYMERS**

(75) Inventors: **Donald Kendall Drummond**,
Quakertown, PA (US); **Patrick Clinton**
Wernett, Upper Black Eddy, PA (US)

(73) Assignee: **Minerals Technologies Inc.**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/578,066**

(22) Filed: **May 24, 2000**

Related U.S. Application Data

(62) Division of application No. 09/286,742, filed on Apr. 6,
1999, now Pat. No. 6,090,242.

(51) **Int. Cl.**⁷ **C08F 212/00**

(52) **U.S. Cl.** **526/307.4; 526/277; 526/278;**
526/287; 526/303.1; 526/307.3

(58) **Field of Search** **526/303.1, 277,**
526/278, 287, 307.3, 307.4

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,879,361 A * 11/1989 Rehmer et al. 526/201
5,064,730 A * 11/1991 Takano et al. 428/694
5,985,992 A * 11/1999 Chen 524/814

* cited by examiner

Primary Examiner—Helen L. Pezzuto

(74) *Attorney, Agent, or Firm*—Marvin J. Powell; Michael
J. Herman

(57) **ABSTRACT**

Novel polymers are provided having phosphonated and
sulphonated substituent groups such that the polymer is
multifunctional in its use. Optional amide substituents are
used to reduce electrostatic charge density or for hydrogen
bonding. An advantage of the polymer is the flexibility of
using it for multiple purposes. A particular application is for
bonding paper fillers and paper fiber together.

12 Claims, No Drawings